WHAT IS CLAIMED IS:

1. A low-friction sliding mechanism, comprising:

a first sliding member having a sliding surface, at least the sliding surface of the first sliding member being made of a diamond-like carbon material;

a second sliding member having a sliding surface slidable relative to the sliding surface of the first sliding member, at least the sliding surface of the second sliding member being made of either one of an aluminum-based alloy material, a magnesium-based alloy material and a diamond-like carbon material; and

a lubricant applied to the sliding surfaces of the first and second sliding members, the lubricant comprising at least one of an ashless fatty-ester friction modifier and an ashless aliphatic-amine friction modifier.

2. A low-friction sliding mechanism according to Claim 1, wherein the diamond-like carbon material of the first sliding member is hydrogen-free amorphous carbon.

3. A low-friction sliding mechanism according to Claim 1, wherein the aluminum-based alloy material of the second sliding member is a hypoeutectic or hypereutectic aluminum alloy containing 4 to 20% by mass silicon and 1.0 to 5.0% by mass copper.

4. A low-friction sliding mechanism according to Claim 1, wherein the magnesium-based alloy material of the second sliding member is at least one alloy selected from the group consisting of magnesium-aluminum-zinc alloys, magnesium-aluminum-rare earth metal alloys, magnesium-aluminum-calcium alloys, magnesium-zinc-aluminum-calcium alloys, magnesium-aluminum-calcium-rare earth metal alloys, magnesium-aluminum-strontium alloys, magnesium-aluminum-silicon alloys,

magnesium-rare earth metal-zinc alloys, magnesium-silver-rare earth metal alloys and magnesium-yttrium-rare earth metal alloys.

5. A low-friction sliding mechanism according to Claim 1, wherein the diamond-like carbon material of the second sliding member is hydrogen-free amorphous carbon.

6. A low-friction sliding mechanism according to Claim 1, wherein each of the sliding surfaces of the first and second sliding member has an arithmetic mean roughness of 0.1 μm or less.

7. A low-friction sliding mechanism according to Claim 1, wherein the first sliding member comprises a base and a coating of the diamond-like carbon material applied to the base to define the sliding surface, the coating has a thickness of 0.3 to 2.0 μm and a micro Vickers hardness H_V of 1000 to 3500 as measured by application of a 10 g load, the second sliding member is made of the aluminum-based alloy material, and the sliding surface of the second sliding member has a Brinell hardness H_B of 80 to 130.

8. A low-friction sliding mechanism according to Claim 1, wherein the first sliding member comprises a base and a coating of the diamond-like carbon material applied to the base to define the sliding surface, the coating has a thickness of 0.3 to 2.0 μm and a micro Vickers hardness H_V of 1000 to 3500 as measured by application of a 10 g load, the second sliding member is made of the magnesium-based alloy material, and the sliding surface of the second sliding member has a Brinell hardness H_B of 45 to 95.

9. A low-friction sliding mechanism according to Claim 1, wherein each of the first and second sliding members comprises a base and a coating of the diamond-like carbon material applied to the base to define the sliding surface, and the coating of each of the first and second sliding members has a thickness

of 0.3 to 2.0 μm and a micro Vickers hardness H_V of 1000 to 3500 as measured by application of a 10 g load.

10. A low-friction sliding mechanism according to Claim 1, wherein the sliding mechanism is for use in an internal combustion engine.

11. A low-friction sliding mechanism according to Claim 1, wherein the fatty-ester friction modifier and the aliphatic-amine friction modifier are a fatty acid ester and an aliphatic amine having C_6-C_{30} straight or branched hydrocarbon chains, respectively, and said at least one of the fatty-ester friction modifier and the aliphatic-amine friction modifier is contained in an amount of 0.05 to 3.0% by mass based on a total mass of the lubricant.

12. A low-friction sliding mechanism according to Claim 1, wherein the lubricant further comprises polybutenyl succinimide and/or a derivative thereof.

13. A low-friction sliding mechanism according to Claim 12, wherein the polybutenyl succinimide and/or the derivative thereof is contained in an amount of 0.1 to 15% by mass based on a total mass of the lubricant.

14. A low-friction sliding mechanism according to Claim 1, wherein the lubricant further comprises zinc dithiophosphate in an amount of 0.1% or less by mass in terms of an phosphorus element based on a total mass of the lubricant.